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1 SIGSAM BULLETIN: Computer algebra in the life sciences

Michael P. Barnett

December 2002 **ACM SIGSAM Bulletin**, Volume 36 Issue 4

Full text available: pdf(240.15 KB) Additional Information: full citation, abstract, references

This note (1) provides references to recent work that applies computer algebra (CA) to the life sciences, (2) cites literature that explains the biological background of each application, (3) states the mathematical methods that are used, (4) mentions the benefits of CA, and (5) suggests some topics for future work.

2 Session P11: visualization systems and image-based visualization: Scalable alignment of large-format multi-projector displays using camera homography trees

Han Chen, Rahul Sukthankar, Grant Wallace, Kai Li

October 2002 **Proceedings of the conference on Visualization '02**

Full text available: pdf(1.38 MB) Additional Information: full citation, abstract, references, citings, index terms

This paper presents a vision-based geometric alignment system for aligning the projectors in an arbitrarily large display wall. Existing algorithms typically rely on a single camera view and degrade in accuracy[1] as the display resolution exceeds the camera resolution by several orders of magnitude. Naïve approaches to integrating multiple zoomed camera views fail since small errors in aligning adjacent views propagate quickly over the display surface to create glaring discontinui ...

Keywords: automatic alignment, camera-based registration and calibration, camera-projector systems, display wall, evaluation, large-format tiled projection display, scalability, simulation

3 Defense science board recommendations: an examination of defense policy on the use of modeling and simulation

Barry M. Horowitz

December 1990 **Proceedings of the 22nd conference on Winter simulation**

Full text available: pdf(934.58 KB) Additional Information: full citation, citings, index terms

4 The digital Michelangelo project: 3D scanning of large statues

Marc Levoy, Kari Pulli, Brian Curless, Szymon Rusinkiewicz, David Koller, Lucas Pereira, Matt Ginzton, Sean Anderson, James Davis, Jeremy Ginsberg, Jonathan Shade, Duane Fulk

July 2000 **Proceedings of the 27th annual conference on Computer graphics and interactive techniques**

Full text available: pdf(10.83 MB) Additional Information: full citation, abstract, references, citings, index terms

We describe a hardware and software system for digitizing the shape and color of large fragile objects under non-laboratory conditions. Our system employs laser triangulation rangefinders, laser time-of-flight rangefinders, digital still cameras, and a suite of software for acquiring, aligning, merging, and viewing scanned data. As a demonstration of this system, we digitized 10 statues by Michelangelo, including the well-known figure of David, two building interiors, and all 1,163 extant f ...

Keywords: 3D scanning, cultural heritage, graphics systems, mesh generation, range images, rangefinding, reflectance and shading models, sensor fusion

5 On-line extraction of SCSI disk drive parameters

Bruce L. Worthington, Gregory R. Ganger, Yale N. Patt, John Wilkes

May 1995 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 1995 ACM SIGMETRICS joint international conference on Measurement and modeling of computer systems**, Volume 23 Issue 1

Full text available: pdf(1.21 MB) Additional Information: full citation, abstract, references, citings, index terms

Sophisticated disk scheduling algorithms require accurate, detailed disk drive specifications, including data about mechanical delays, on-board caching and prefetching algorithms, command and protocol overheads, and logical-to-physical block mappings. Comprehensive disk models used in storage subsystem design require similar levels of detail. We describe a suite of general-purpose algorithms and techniques for acquiring the necessary information from a SCSI disk drive. Using only the ANSI-standa ...

6 Recognition section: Motion analysis of Omni-Directional video streams for a mobile sentry

Tarak Gandhi, Mohan M. Trivedi

November 2003 **First ACM SIGMM international workshop on Video surveillance**

Full text available: pdf(1.04 MB) Additional Information: full citation, abstract, references, index terms

A mobile platform mounted with Omni-Directional Vision Sensor (ODVS) can be used to monitor large areas and detect interesting events such as independently moving persons and vehicles. To avoid false alarms due to extraneous features, the image motion induced by the moving platform should be compensated. This paper describes a formulation of parametric ego-motion compensation for an ODVS. Omni images give 360 degrees view of surroundings but undergo considerable image distortion. To account for ...

Keywords: dynamic vision, intruder detection, mobile robots, motion detection, optical flow, panoramic vision, surveillance

7 Multimodal technologies: Multimodal feedback: establishing a performance baseline for improved access by individuals with visual impairments

Holly S. Vitense, Julie A. Jacko, V. Kathlene Emery

July 2002 **Proceedings of the fifth international ACM conference on Assistive technologies**

Full text available: pdf(826.60 KB) Additional Information: full citation, abstract, references, index terms

Multimodal interfaces have the potential to enhance a user's overall performance, especially when one perceptual channel, such as vision, is compromised. This research investigated how unimodal, bimodal, and trimodal feedback affected the performance of fully sighted users. Limited research exists that investigates how fully sighted users react to multimodal feedback forms, and to-date even less research is available that has investigated how users with visual impairments respond to multiple for ...

Keywords: auditory, feedback, haptic, human-computer interaction, multimodal, visual, visual impairment

8 Illustrative risks to the public in the use of computer systems and related technology

Peter G. Neumann

January 1996 **ACM SIGSOFT Software Engineering Notes**, Volume 21 Issue 1

Full text available: pdf(2.54 MB) Additional Information: full citation

9 First Person Indoor/Outdoor Augmented Reality Application: ARQuake

Bruce Thomas, Ben Close, John Donoghue, John Squires, Phillip De Bondi, Wayne Piekarski

January 2002 **Personal and Ubiquitous Computing**, Volume 6 Issue 1

Full text available: pdf(363.52 KB) Additional Information: full citation, abstract, index terms

This paper presents a first person outdoor/indoor augmented reality application ARQuake that we have developed. ARQuake is an extension of the desktop game Quake, and as such we are investigating how to convert a desktop first person application into an outdoor/indoor mobile augmented reality application. We present an architecture for a low cost, moderately accurate six degrees of freedom tracking system based on GPS, digital compass, and fiducial vision-based tracking. Usability issues such as ...

10 Social weight: designing to minimise the social consequences arising from technology use by the mobile professional

Aaron Toney, Barrie Mulley, Bruce H. Thomas, Wayne Piekarski

October 2003 **Personal and Ubiquitous Computing**, Volume 7 Issue 5

Full text available: pdf(431.74 KB) Additional Information: full citation, abstract

This paper defines the concept of social weight as a design consideration and presents the e-SUIT, a social weight research platform incorporated covertly within a traditional business suit. The e-SUIT allows its user to strike a balance between a given technology's derived benefit and its social consequence. As the e-SUIT is designed for research within a business context, it is built upon commercially

available enterprise software. This work is a first step towards subjecting the empirical soc ...

Keywords: Mobile professional, Social weight, Wearable

11 Integrated solid modeler based solutions for machining

Allan D. Spence, Farid Abrari, M. A. Elbestawi

June 1999 **Proceedings of the fifth ACM symposium on Solid modeling and applications**

Full text available: pdf(1.25 MB) Additional Information: full citation, references, index terms

Keywords: finite element analysis, machining simulation, online monitoring and control, solid modeling

12 Supporting collaborative field operations with personal information processing systems

Stephanie Guerlain, Jim Lee, Troy Kopischke, Tom Romanko, Peter Reutiman, Scott Nelson

March 1999 **Mobile Networks and Applications**, Volume 4 Issue 1

Full text available: pdf(1.15 MB) Additional Information: full citation, abstract, references, citings, index terms, review

This paper describes a two-year research project to develop a personal information processing system (PIPS) solution for the roving industrial field operator. Our PIPS system comprises (1) an RF network to deliver wireless digital information, (2) a wearable computer for delivering web-based information (the hardware is a two-piece system composed of a belt-worn NetPC attached via a curly cable to a handheld unit with a mouse/display device combination), and (3) software applications that p ...

13 Interacting with paper on the DigitalDesk

Pierre Wellner

July 1993 **Communications of the ACM**, Volume 36 Issue 7

Full text available: pdf(5.32 MB) Additional Information: full citation, references, citings, index terms, review

14 Applications and OS: Wireless sensor networks for habitat monitoring

Alan Mainwaring, David Culler, Joseph Polastre, Robert Szewczyk, John Anderson

September 2002 **Proceedings of the 1st ACM international workshop on Wireless sensor networks and applications**

Full text available: pdf(542.04 KB) Additional Information: full citation, abstract, references, citings, index terms

We provide an in-depth study of applying wireless sensor networks to real-world habitat monitoring. A set of system design requirements are developed that cover the hardware design of the nodes, the design of the sensor network, and the capabilities for remote data access and management. A system architecture is proposed to address these requirements for habitat monitoring in general, and an instance of the architecture for monitoring seabird nesting environment and behavior is presented. The cu ...

Keywords: environmental monitoring, habitat monitoring, low power systems,

sensor network architecture, wireless sensor networks

15 Low-power micromachined microsystems (invited talk)

Khalil Najafi

August 2000 **Proceedings of the 2000 international symposium on Low power electronics and design**

Full text available: pdf(1.40 MB) Additional Information: full citation, abstract, references, index terms

Micromachined microsystems and Micro Electro Mechanical Systems (MEMS) have made possible the development of highly accurate and portable sensors and instrument for a variety of applications in the health care, industrial, consumer products, avionics, and defense. Design of low-power circuits for these applications, and use of micromachined sensors and actuators in combination with integrated circuits to implement even lower power microinstruments has now become possible and the focus of at ...

Keywords: MEMS, energy harvesting, low-power, micromachining, microsystems, power sources

16 A desk supporting computer-based interaction with paper documents

William Newman, Pierre Wellner

June 1992 **Proceedings of the SIGCHI conference on Human factors in computing systems**

Full text available: pdf(750.03 KB) Additional Information: full citation, abstract, references, citings, index terms

Before the advent of the personal workstation, office work practice revolved around the paper document. Today the electronic medium offers a number of advantages over paper, but it has not eradicated paper from the office. A growing problem for those who work primarily with paper is lack of direct access to the wide variety of interactive functions available on personal workstations. This paper describes a desk with a computer-controlled projector and camera above it. The result is a syste ...

Keywords: desk, desktop, display, document recognition, input device, interaction technique, user interface, workstation

17 Queries and aggregation: Cleaning and querying noisy sensors

Eiman Elnahrawy, Badri Nath

September 2003 **Proceedings of the 2nd ACM international conference on Wireless sensor networks and applications**

Full text available: pdf(256.08 KB) Additional Information: full citation, abstract, references, index terms

Sensor networks have become an important source of data with numerous applications in monitoring various real-life phenomena as well as industrial applications and traffic control. Unfortunately, sensor data is subject to several sources of errors such as noise from external sources, hardware noise, inaccuracies and imprecision, and various environmental effects. Such errors may seriously impact the answer to any query posed to the sensors. In particular, they may yield imprecise or even incorre ...

Keywords: bayesian theory, noisy sensors, query evaluation, statistics, uncertainty, wireless sensor networks

18 Dynamic fine-grained localization in Ad-Hoc networks of sensors

Andreas Savvides, Chih-Chieh Han, Mani B. Strivastava

July 2001 **Proceedings of the 7th annual international conference on Mobile computing and networking**

Full text available: pdf(5.16 MB) Additional Information: full citation, abstract, references, citings, index terms

The recent advances in radio and em beddedsystem technologies have enabled the proliferation of wireless microsensor networks. Such wirelessly connected sensors are released in many diverse environments to perform various monitoring tasks. In many such tasks, location awareness is inherently one of the most essential system parameters. It is not only needed to report the origins of events, but also to assist group querying of sensors, routing, and to answer questions on the network coverage. ...

Keywords: localization, location discovery, wireless sensor networks

19 Sensor networks: Lightweight sensing and communication protocols for target enumeration and aggregation

Qing Fang, Feng Zhao, Leonidas Guibas

June 2003 **Proceedings of the 4th ACM international symposium on Mobile ad hoc networking & computing**

Full text available: pdf(331.14 KB) Additional Information: full citation, abstract, references, index terms

The development of lightweight sensing andcommunication protocols is a key requirement for designing resource constrained sensor networks. This paper introduces a set of efficient protocols and algorithms, DAM, EBAM, and EMLAM, for constructing and maintaining sensor aggregates that collectively monitor target activity in the environment. A sensor aggregate comprises those nodes in a network that satisfy a grouping predicate for a collaborative processing task. The parameters of the predicate de ...

Keywords: applications for ad hoc networks, distributed algorithms for ad hoc networks, processing and fusion of data in sensor networks, self-configuration in ad hoc networks

20 Illuminating light: an optical design tool with a luminous-tangible interface

John Underkoffler, Hiroshi Ishii

January 1998 **Proceedings of the SIGCHI conference on Human factors in computing systems**

Full text available: pdf(1.24 MB) Additional Information: full citation, references, citings, index terms

Keywords: augmented reality, engineering simulation, holography, interactive projection, luminous interface, optics, prototyping tool, tangible bits, tangible interface